

ANTARCTIC INTERMEDIATE WATER VARIABILITY IN A COUPLED CLIMATE MODEL

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We examine the variability of Antarctic Intermediate Water (AAIW) in a long-term natural integration of a coupled climate model. The mean state of the climate model includes a reasonably realistic representation of AAIW, owing in part to the use of the Gent-McWilliams mixing scheme. Using complex EOF analyses we present 3 dominant modes of variability showing circumpolar patterns of wavenumber-1, 2 and 3 on the AAIW density surface. The modes contain eastward propagating signals at inter-annual to centennial timescales. Possible mechanisms giving rise to the variability are investigated using heat and salt budget analyses on the surface outcrop region of the isopycnal layer. We find that variability in ice-ocean salt fluxes and atmospheric heat fluxes dominate the intermediate water variability at the outcrop region. In contrast, northward Ekman transport of heat and salt plays a significant but localised role in T-S variability. There is also a notable contribution from the Antarctic Circumpolar Current to the variability at the outcrop region via zonal transport of heat and salt.